

CLAIMS

[1] A liquid drop placing apparatus comprising:

an ink jet head;

a substrate receiving a liquid drop discharged from the ink jet head;

5 a device for irradiating or reflecting light from a nozzle hole or its vicinity of the ink jet head toward the substrate;

a position moving device for controlling a relative position between the ink jet head and the substrate; and

a control device for discharging a liquid from the ink jet head;

10 wherein a light-receiving element for recognizing a position of the ink jet head is disposed behind the substrate, when seen from the ink jet head,

the substrate has a transparency at least to a degree that the irradiated light or the light reflected from the nozzle hole or its vicinity toward the substrate enters the light-receiving element, and

15 the light-receiving element senses the irradiated light or the light reflected from the nozzle hole or its vicinity toward the substrate.

[2] The liquid drop placing apparatus according to claim 1, further comprising a system for moving the light-receiving element as one piece with the substrate with a movement of the substrate.

20 [3] The liquid drop placing apparatus according to claim 1, wherein a reflector plate that is semi-transparent to light is provided between the substrate and the light-receiving element,

a light source is provided for making light parallel with a surface of the substrate incident onto the reflector plate, and

25 the reflector plate is disposed and adjusted so as to reflect a part of the incident light in a direction of the ink jet head and transmit a part of the light reflected from the ink jet head on a side of the light-receiving element.

[4] The liquid drop placing apparatus according to claim 1, wherein the ink jet head comprises a system for irradiating light from an inside of the
30 nozzle hole discharging the liquid toward the substrate.

[5] The liquid drop placing apparatus according to claim 4, wherein the system for irradiating the light from the inside of the nozzle hole toward the substrate comprises the nozzle hole, a pressure chamber for generating a pressure for discharging the liquid from a nozzle, a flow channel for supplying the liquid to the pressure chamber, a container for storing the liquid and a tube for transporting the liquid from the container to the flow channel, and a surface that the liquid contacts is formed of a light-reflecting material, and light from a light source is brought into the container and guided to the nozzle hole.

10 [6] The liquid drop placing apparatus according to claim 1, wherein the substrate is a glass or a resin.

[7] The liquid drop placing apparatus according to claim 1, wherein the ink jet head is a head for discharging the liquid by a vibration using a piezoelectric element or a head for discharging the liquid by an air bubble generation caused by a thermic effect.

[8] A liquid drop placing method in which a liquid is discharged from an ink jet head and placed to a surface of a substrate, the method comprising: disposing a light-receiving element on a liquid discharge side of the ink jet head;

20 disposing the substrate between the ink jet head and the light-receiving element;

determining a position of the ink jet head with the light-receiving element before discharging the liquid;

setting a relative position between the ink jet head and the substrate based on the determined information, and placing the liquid to the substrate.

[9] The liquid drop placing method according to claim 8, further comprising a system for moving the light-receiving element as one piece with the substrate with a movement of the substrate.

30 [10] The liquid drop placing method according to claim 8, wherein a

reflector plate that is semi-transparent to light is provided between the substrate and the light-receiving element,

a light source is provided for making light parallel with the surface of the substrate incident onto the reflector plate, and

5 the reflector plate is disposed and adjusted so as to reflect a part of the incident light in a direction of the ink jet head and transmit a part of the light reflected from the ink jet head on a side of the light-receiving element.

[11] The liquid drop placing method according to claim 8, wherein the ink jet head comprises a system for irradiating light from an inside of a nozzle
10 hole discharging the liquid toward the substrate.

[12] The liquid drop placing method according to claim 11, wherein the system for irradiating the light from the inside of the nozzle hole toward the substrate comprises the nozzle hole, a pressure chamber for generating a
15 the liquid to the pressure chamber, a container for storing the liquid and a tube for transporting the liquid from the container to the flow channel, and

a surface that the liquid contacts is formed of a light-reflecting material, and light from a light source is brought into the container and guided to the nozzle hole.

20 [13] The liquid drop placing method according to claim 8, wherein the substrate is a glass or a resin.

[14] The liquid drop placing method according to claim 8, wherein the ink jet head is a head for discharging the liquid by a vibration using a piezoelectric element or a head for discharging the liquid by an air bubble
25 generation caused by a thermic effect.